

## Patent claims

1. A comb filter arrangement for decimating a sequence of digital input values ( $x_i$ ) into a sequence of digital output values ( $y_j$ ) by a non-integral factor  $M + \alpha$ ,  $M$  being a positive integer and  $0 < \alpha < 1$ , with:
- an input-end integrator (10) of the  $n$ -th order whose output can be fed to at least three signal paths (20, 30, 40);
- each signal path (20, 30, 40) having:
- an adjustable delay stage (22, 32, 42) with delay  $m \cdot k$  which can be set to different values,  $m = 1, 2, 3$  and  $k$  being a delay factor,
- a following decimator stage (24, 34, 44) by the factor  $M$ , where  $M = 1, 2, 3, \dots$ , and
- an output-end differentiator stage (26, 36, 46) for generating intermediate output values ( $y_i, y_{i+k}, y_{i+2k}$ ) which are connected to an input of an interpolation arrangement (60) at whose output the decimated sequence of digital output values ( $y_j$ ) can be tapped
- it being possible for the interpolation arrangement (60) always to interpolate between two intermediate output signal values ( $y_i, y_{i+k}; y_{i+k}, y_{i+2k}$ ) which have an interval of  $k/f$ ,  $f$  being a sampling rate;
- the interpolation arrangement (60) having two switch-over devices (62, 64) whose inputs ( $e_1, e_2, e_3$ ) are each connected to an output of the differentiator stages (26, 36, 46) and whose outputs ( $a$ ) are connected to in each case one amplifier (70, 72);
- an adder stage (80) for adding the output signals of the two amplifiers (70, 72) at whose output the sequence of the decimated digital output values ( $y_j$ ) can be tapped being provided; and

the first amplifier (70) having a gain factor  $\alpha$  and the second amplifier (72) having a gain factor  $1-\alpha$ .

- 5 2. The comb filter arrangement as claimed in claim 1, wherein the interpolation arrangement (60) can carry out a linear interpolation.
- 10 3. The comb filter arrangement as claimed in one of claims 1 or 2, wherein a control device (100) is provided for switching over the switch-over devices (62, 64) in accordance with the two intermediate output values ( $y_i$ ,  $y_{i+k}$ ;  $y_{i+k}$ ,  $y_{i+2k}$ ) to be interpolated.
- 15 4. The comb filter arrangement as claimed in one of claims 1 to 3, wherein a control device (100) is provided by means of which the delays  $m \cdot k$  of the delay stages (22, 32, 42) can be set.
- 20 5. The comb filter arrangement as claimed in one of claims 1 to 4, wherein the delays  $k \cdot m$  of the individual delay stages (22, 32, 42) are selected with respect to one another so that they differ from one another by an integral multiple.
- 25 6. The comb filter arrangement as claimed in one of claims 1 to 5, wherein  $m = n$ .
- 30 7. The comb filter arrangement as claimed in one of claims 1 to 6, wherein the comb filter arrangement is implemented by means of a microprocessor to which the digital input values ( $x_i$ ) can be fed as input data, and at whose output the digital output values ( $y_j$ ) can be tapped.
- 35